type could be used for penetration into or about a targeted tissue. The probe **400**, or plurality thereof, can also cooperate with a ground pad (not shown).

FIGS. 16A–16B illustrate another preferred embodiment of probe **475** that operates exactly as described above in the probe of FIGS. 15A-15B. The only difference is that introducer **476** slidably carries an energy delivery member **480** that has a helical configuration when deployed from the introducer to thereafter be disposed in a helical manner about a targeted tissue **tt** (phantom view). In this embodiment, the paired engagement portions **422a-422b** are again independent as described in the probe of FIG. 15A. Each engagement surface **422a** and **422b** has the same a conductive surface portion (**440A** or **440A'**) in contact with the medial PTC layer (**440B** or **440B'**) and core conductor (**440C** or **440C'**) as illustrates in the previous embodiment (see FIG. 15B). As can be seen in FIG. 16A, the segmented engagement surfaces can be carried on opposing sides of the energy delivery member **480** when in its deployed-expanded position.

FIG. 16B shows an enlarged view of a portion of the helical energy delivery member **480** to further depict that manner of operation. By providing a helical means of deployment, the opposing energy delivery surfaces engagement surface **422a** and **422b** can cause an electrical field and Rf energy density across the center **490** of the helix to focus the application of energy to tissue that is circumscribed by the energy delivery member **480**. The energy delivery member **480** of FIG. 16B thus is adapted to function as described previously to modulate energy application to the targeted tissue **tt** as each thermally sensitive medial layer of the working end hovers about its selected switching range.

5. <u>Type "D" probe for tumor ablation</u>. An exemplary working end of a Type "D" probe **500** of the invention is illustrated in FIGS. 17 and 18 that again is adapted for energy delivery to a targeted tumor tissue. The energy delivery member **520** defines an engagement plane **525** that differs from the Types "A" and "B" embodiments in its ability to provide a selected energy delivery profile across the dimensions of the engagement plane **525**. The working end again comprises a conductive surface engagement plane or portion **540A** that overlies the medial conductive portion **540B** that us fabricated of a PTC-type material (see FIG. 18). The surface conductive **540A** portion in this exemplary embodiment is indicated as a thin metallic layer. The variable conductive medial portion **540B** can be a rigid ceramic material of the

Type "A" embodiment or a flexible silicone-based material as described in a Type "B" embodiment. The probe again has a core conductive portion (electrode) **540C** that is coupled to the variable conductive medial portion **540B**. The core conductive electrode **540C** again is coupled to electrical source **150A** and controller **150B**, as described previously. Of particular interest, referring to FIG. 18, the variable conductive medial portion **540B** comprises at least two spaced apart portions **544a** and **544b** that each are of a different PTC-type composition with each having a different selected switching range. FIG. 18 illustrates an insulative material **546** of any suitable dimension positioned between the two medial conductive portions **544a** and **544b**.

As an example, assume that the probe of FIG. 18 is fabricated with a proximal variable conductive portion **544a** that has a switching range around 70° C. The more distal variable conductive portion **544b** has a switching range around 85° C. In operation, it can be understood how the application of active Rf energy to targeted tissue **tt** can create "shaped" isotherms **555** around a tumor. FIG. 18 is a graphic representation of the type of energy application and thermal effects that can be achieved. It should be appreciated that the scope of the invention includes any working end fabrication that utilizes a plurality of PTC-type compositions for shaping energy application. The different conductive portions **544a-544*n*** (where ***n*** represents the plurality of PTC conductors) of an exemplary engagement plane **525** can extend along axial portions of a needle, can extend in radial portion about a needle, can comprise different axial or concentric portions of an engagement surface of a jaw or other tissue contacting member as shown in FIGS. 12-13.

FIG. 19 illustrates another embodiment of Type "D" working end that is very similar to the embodiment of FIG. 18. In FIG. 19, the conductive engagement plane or portion **540A** and core electrode **540C** are identical to the probe of FIG. 18. The variable conductive medial portion indicated at **540B** differs in that it comprises a substrate composition that has a first end **570a** having a first selected switching range with a PTC gradient that extends over the dimension of the medial portion **540B** to a second end **570b** that has a second selected switching range. It is possible to manufacture either the rigid ceramic PTC type materials of the Type "A" embodiment or the flexible silicone-based materials of the Type "B" embodiment with such a temperature-resistance gradient.

6. Type "E" probe for energy delivery to tissue. FIGS. 20 and 21 illustrate the working end of a Type "E" probe **600** corresponding to the invention. The probe again is adapted for energy delivery to a targeted tumor tissue, this time utilizing another embodiment of the flexible-compressive PTC-type material of the Type "B" embodiment described previously. In FIG. 20, it can be seen that energy delivery member **620** defines an engagement plane **625** that extends along an axial portion of the probe body. The conductive surface engagement portion **640A** comprises a plurality of elongate conductive elements that expose therebetween portions of the compressible medial conductive portion **640B**. The medial conductive portion **640B** is silicone-based PTC type material as described above in relation to FIGS. 8-13. (Alternatively, the surface could be a thin microporous metallic coating). The probe has a core conductive portion (electrode) **640C** that is coupled to electrical source **150A** and controller **150B**, as described previously. In this embodiment, referring to FIG. 21, the system is adapted to deliver saline flow from fluid source **642** directly through an open cell structure of the silicon-based medial conductive layer. Such an open cell silicone can be provided adding foaming agents to the silicone during its forming into the shape required for any particular working end. The silicone has a conductive material added to matrix as described above, such as carbon.

In use, referring to FIG. 21, the system can apply saline solution through pores **645** in the medial conductive portion **640B** that are exposed at the exterior of the probe (see arrows **AA**) proximate to the plurality of conductive surface engagement portions indicated at **640A**. As described above in relation to FIG. 10B, one method of the invention provides for the infusion of saline during an interval of energy application to tissue to enhance both active Rf heating and conductive heating as the system maintains tissue temperature at the selected switching range of the medial conductive portion **640B**. In another aspect of the invention, the compressibility of the silicone-based medial conductive portion **640B** can alter the volume and flow of saline within the open cell silicone medial conductive portion **640B**. Since the saline is conductive, it functions as a conductor within the cell voids of the medial conductive portion **640B**, and plays the exact role as the carbon doping does within the walls of cells that make up the silicone. Thus, the extent of expansion or compression of the silicone medial conductive portion **640B** alters its resistivity, when the conductive doping of the material is somewhat static. Thus, this effect can be used to design into the working end certain PTC characteristics of to cause the working end to perform in an optimal manner.